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ABSTRACT

Cross-sectional and longitudinal acquisition data for English, German, Italian, and Turkish children ranging in age from approximately 1 to 4 provide a preliminary answer to the question of whether there is a consistent interlanguage order of development of notions of conjunction. It was found that children first conjoin sentences by simple juxtaposition without a surface connective, and thus the basic assumption is that notions of conjunction are acquired prior to the surface particles that mark them. With juxtaposition as a starting point, a regular order of development appears in the acquisition of the different types of semantic relationships underlying conjunction which are symmetric coordination, antithesis, sequence, and causality. Soon after the early causal statements, the first conditional notions emerge, appended to simple directives. Conditional and temporal "when" statements next appear followed by simultaneity and finally the use of "before" and "after" in subordinate clauses. The consistency of these findings across four languages strongly suggests the existence of a universal cognitive order of emergence in the acquisition of the notions underlying conjoined statements. (EJS)

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THE ACQUISITION OF CONJUNCTION: A CROSS-LINGUISTIC STUDY

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With the assumption that cognitive development is the basis of language acquisition, Slobin (1973) proposes that the order of emergence of semantic notions across languages is constant, regardless of the formal means of expression used by different languages. To evaluate this hypothesis, we have investigated some of the notions that a child acquires, in particular those underlying the connection of utterances in coordinate and subordinate relationships. Acquisition records of four languages, English, German, Italian, and Turkish, have provided us with a preliminary answer to the question of whether there is a consistent inter-language order of development of notions of conjunction.

DATA AND PROCEDURE

We used both cross-sectional and longitudinal data from various sources (see Table I). Our English longitudinal record consists of utterances

Table I.

Data	Cross-Sectional	Longitudinal
English	2.0 - 4.0	2.3 - 4.8
Italian	2.0 - 4.4	1.6 - 2.5
Turkish	2.0 - 4.8	___
German	___	1.2 - 4.6

from Roger Brown's subject, Adam, from 2.3 to 4.8, while the English cross-sectional data consist of records from 13 children from 2.0 to 4.0, collected by the Berkeley Cross-Linguistic Language Development Project.[1] Our Turkish data, entirely cross-sectional, include utterances of children from the ages 2.0 to 4.8, also collected by the Berkeley project. Our Italian transcripts include the Berkeley project's cross-sectional data from 35 children, ages 2.0 to 4.4, and longitudinal data from 6 children from the ages of 1.6 to 2.5, collected monthly at a Paduan day care center. The German data, entirely longitudinal, come from the various diary studies (principally from the Sterns) and include written records from 3 children, ages 1.2 to 4.6

[1] Conducted by Dan I. Slobin, Francesco Antinucci, Tom Bever, Susan Ervin-Tripp, Judith Johnston, and Ljubica Radulović.

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To analyze the data, we noted the first utterance expressing a specific conjunction type, whether an explicit connective was present or not. We determined an individual developmental sequence for Adam and for each of the German children. We then compared the German children to each other to establish a composite order of development. To determine an order of emergence for all the cross-sectional data (i.e., Italian, English and Turkish), and also for the Italian longitudinal transcripts, we noted for each language the earliest instance of a particular notion for any child, tracing each change in formal expression. Four composite charts summarize our findings (see Table II).

Table II.

Comparative Order of Acquisition in English, Italian, Turkish and German

English		Italian	German	Turkish
Longitudinal	Cross-Sectional	Long. and Cross-sect.	Longitudinal	Cross-Sectional
2.3 coordination	2.0 coordination	1.6 coordination	1.5 coordination	2.0 coordination
2.4 sequence	sequence	antithesis	1.8 antithesis	sequence
2.9 antithesis	antithesis	causality	1.9 sequence	antithesis
2.10 causality	causality	1.7 sequence	causality	cause/condition
2.11 reasons	2.8 when	1.8 reasons	2.7 when	2.8 causality
3.2 when	3.4 while	2.0 conditionality	2.9 conditionality	reasons
conditionality		2.8 when	4.3 while	3.4 conditionality
3.3 while		while		when
3.5 after		after		while
4.0 before		3.4 before		3.8 after
				before

A word of caution: a while back, the American humorist, Robert Benchley wrote an essay proving that platypuses do not lay eggs. His evidence: photographs of platypuses--not laying eggs.[2] The diary studies may be providing similar evidence: because something isn't reported doesn't mean it didn't occur. This objection applies with equal force to the taped interviews comprising our cross-sectional data. It is heartening to learn, however, that the German data gleaned from the diary studies uncannily matches the data collected for the Berkeley project. Either there is a major coincidence, or both sources are equally valid.

RESULTS AND DISCUSSION

A general trend appears in the surface expression of conjoined statements. In the German diaries and in the English longitudinal record as well as in the speech samples of the younger subjects of the cross-sectional studies, we have found that children first conjoin sentences by simple juxtaposition without a surface connective. Our basic assumption, then, is that notions of conjunction are acquired prior to the surface particles that mark them.

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[2] This anecdote was originally used by Charles Fillmore in a lecture at U.C.-Berkeley.

With juxtaposition as the child's starting point, a regular order of development appears in the acquisition of the different types of semantic relationships underlying conjunction. In all four languages, juxtaposition expresses four basic types of relationships: coordination, antithesis, sequence, and causality.

Reversible coordination of objects in space is the first example of coordinating conjunction to emerge:

1) Da is brrbrr, da sich wauwau. (German, 1.5)[3]
(There is horse, there see dog.)

2) My, my paper . . . pencil. (English, 2.3)[4]

A perceptual basis seems to underlie this linkage; the child focuses sequentially on one object at a time. Another early type of coordination is the conjunction of several arguments of a single predicate. The child may express these arguments sequentially with no particle, for example,

3) Tatàn papà mamma Etta. (Italian, 1.7)
(Bye-bye papa, mama, Orietta)

Or he may let the predicate be understood from context, as in example 4:

4) tinke, fische, hute. (German, 1.8)
(Telling mother to draw: something to drink, a ship, a hat)

The child can also add arguments by the use of particles like the English <u>too</u>, as in examples 5-8:

5) Find doggie. Doggie. Tiger too. (English, 2.3)

6) Bavo papa mio, anche Lele bavo. (Italian, 1.9)
(My daddy good, also Daniele good)

7) Anna ambam hol, au mil. (German, 2.1)
(Anna, get food, also milk)

8) Ben çay da içtim, Bon da içti. (Turkish, 2.0)
(I drank tea, Bon drank too)

At about the same time as these primitive coordinations, statements of antithesis appear in the data. The basis for antithesis can be found in simple negation, a flat refusal to comply with some adult demand, for example,

9) No . . . mica sola. (Italian, 1.7)
(No, not alone)

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[3] The examples cited in our text are intended to be representative of the stage; they are not the absolute earliest examples.

[4] The apparent lateness of this child's age (Adam) is reflected everywhere in his transcripts. Adam's progress with language proceeded much more slowly than that of the other children in our sample.

The child's earliest notion of antithesis involves the rejection of one proposition and the assertion of an alternative. The initial proposition may come from the context, as in example 10:

10) Hei, pot. (German, 1.8)
(Rejecting the soup offered: No, compote)

Or the initial proposition may be the child's own invention, as in examples 11 and 12:

11) No mangiae . . . gioco io. (Italian, 1.6)
(No eat . . . I play)

12) Ben temizlemiyorum, annem temizliyor. (Turkish, 2.0)
(Response to "Who cleans the floors?":
I don't clean, my mother cleans)

These early antitheses are the precursors of more attenuated forms of contrast, such as the semantic opposition of example 13:

13) Butta pilla . . . mamma bella. (Italian, 2.0)
(Ugly brooch . . . mama /has a/ pretty one)

or the denial of expectation in example 14:

14) Tanti ocattoli . . . no cane. (Italian, 2.4)
(So many toys . . . no dog)

This form of conjunction will later be expressed by particles corresponding to the English <u>but</u>.

In this early stage, we have also found several examples of sequence, an utterance which retains the chronological order of events, as in example 15:

15) Cino Maffimo, dopo ciao. (Italian, 1.7)
(Kiss Massimo, then goodbye)

Most of our examples of sequence are implicitly causal or conditional as well as temporal, although they carry no surface markers which would enable the adult observer to differentiate clearly the exact intention of the child, who may have acquired the necessary cognitive distinctions, but has not yet mastered the linguistic means of expression. Even in adult language the three concepts of cause, time, and condition are closely related and overlap to some extent, as in the adult sentence, "When he eats too much candy, he gets sick." The fuzziness of the three-way distinction is evident in our data from examples in which the precise relationship between clauses is ambiguous, as in examples 16-18"

16) Ben su veririm ona içer. (Turkish, 2.0)
(I give him water, he drinks /it/)

17) Alloa pacco tutto do botte. (Italian, 1.7)
(To child who broke his toy:
So all split, I hit /you/)

18) Ekki beim ab, aba hand aun. (German, 2.1)
(Ekki pull out flowers, Papa hit hand)

In a number of these examples, such as #18, the causal relationship between conjuncts seems to be far more fundamental than the temporal sequence. We have, moreover, found very early cases in our Italian data in which the relationship between the two conjuncts is apparently one of unambiguous causality since the temporal order of the conjuncts is reversed. Two representative examples are 19 and 20:

19) Ca . . . baccio . . . Luca bette. (Italian, 1.6)
(Responding to "Where are you hurt?":
Here . . . arm . . . Luca hit /me/)

20) Qua fatta bua . . . duto pe terra. (Italian, 2.1)
(Here made hurt . . . fell on ground)

The first conjunct, the result, contains information tied to the immediate context, while the causal conjunct is tied to the immediate past.

It is not the case, however, that early conjoined utterances which could be connected in adult speech with "because" always express notions of direct physical causality. In many cases, the child presents in one conjunct the reason for the statement or request given in the other, as in examples 21-23:

21) mama, bild̈ hamele, zimm̈, hamele bild̈ (German, 1.10)
hinten, da da mama choln.
(Mama, want pictures, from room, want
pictures from back there, from there
mama get them)

22) So mica stoie . . . tu conta. (Italian, 1.11)
(I don't know stories . . . you tell)

23) I can't do it. I not big enough. (English, 2.10)

Statements giving reasons emerge in the data at about the same time as causal statements, indicating the intimate relation between the two. In many languages, in fact, a single conjunction is used for both cases, as with English <u>because</u>.

When the child begins to use a surface connective to conjoin causal statements, he has not yet completely mastered the adult concept of "because," a fact evidenced in utterances that are anomalous from the adult point of view. Many of the child's mistakes with "because" are apparently the result of what Piaget (1955) calls "verbal syncretism." The child often comes to believe that two things which have been connected in his personal experience bear a causal relationship to one another, creating implications and justifications which render more explicit this feeling of connection, as in examples 24 and 25:

24) Perchè sono di Cappucetto Rosso. (Italian, 3.4)
(asked why wolves bite:
Because they are from Red Riding Hood)

25) Sei cosi perche non mi conoscevi. (Italian, 4.4)
(commenting on an old photo in which the now long-haired interviewer had short hair: You're like that because you didn't know me)

Neugebauer's (1915) study of her German-speaking son is filled with examples of such reasoning. A man named Kleiner was so named, thought the child, because the man was little, in spite of the fact that Kleiner was an adult (p.305). (The German word klein mean "small.") These errors in the spontaneous use of "because" demonstrate that the child may not have a full understanding of a connective until long after he has achieved syntactic control of its usage. However, the child's attempts at inferential reasoning lead to the acquisition of numerous related surface markers such as the English so, that's why, German darum, da, and dass, Italian allora, and Turkish onun için, ondan, diye.

Sequence is also the root of statements expressing temporal relations. Soon after unmarked juxtapositions, we find the emergence of particles indicating non-reversible temporal sequences. At this point the child begins to mark temporality on the surface, using particles corresponding to the English then.

26) Desse vado mangiare . . . dopo gioco ancora. (Italian, 2.3)
(Now I go to eat . . . then I play again)

27) Ḧst anzie, dann bā gḦhn (German, 2.6)
(first button up, then go on streetcar)

The next surface marker to emerge in the expression of temporal relations can roughly be translated as "when." In early examples, the child seems to be presenting a state or event in the "when" clause which is a precondition for some action to be taken, as in examples 28, 29, and 30:

28) quando si rompe o adduttamo. (Italian, 2.4)
(when it breaks we fix it)

29) Pis olunca temizliyor. (Turkish, 2.0)
(When it's dirty, she cleans)

30) When its got a flat tire, its needa go to the station. (English, 3.2)

"When" is also used in early utterances to express other semantic notions, including future sequence, as in examples 31 and 32:

31) Oraya koyayim enişţem gelince de vereyim. (Turkish, 3.4)
(Let me put it here and when my brother-in-law comes, I'll give /it/.)

32) Quando io dormo viene papa. (Italian, 3.0)
(talking about his father who is away: When I'm sleeping papa /will/ come)

We also find "when" used to express a habitual time at which an event occurs, as in 33:

33) Quando va a letto lagge. (Italian, 3.0)
(Asked when her father reads:
When he goes to bed he reads)

A later development of "when" is the expression of simultaneity, i.e., the description of two past events or states which overlap in time. The appearance of this type of conjunction represents an advance over the earlier "when" statements; for the first time, temporal sequence is not a precondition for the conjunction of the two clauses, and, therefore, the onset of the events in one clause does not necessarily terminate those in the other. We find examples of simultaneity emerging later in all four languages than "when" statements which express sequence:

34) . . . quando mamma era piccola on si lì lavava i denti! (Italian, 2.8)
(When mama was little they used to clean her teeth!

35) Mom I cut my finger. While you were in the bathroom. (English, 3.11)

36) Bunu ben giderken giyiyorum. (Turkish, 3.4)
(I wear this while walking)

37) Als wir eher spazieren gegangen waren, haben wir blaubeeren gegessen. (German, 4.3)
(When we had been going walking before, we ate blueberries)

The final stage in the development of temporal conjunction is the acquisition of "before" and "after". The notions encoded by the use of these particles are basically those expressed by sequence, with an added presupposition or two. In our data, the children typically use "before" and "after" as adverbs earlier than they express notions of simultaneity. The question, then, of adult frequency of usage of these particles as clause markers becomes relevant here, since we find that the children do not use them as conjunctions until significantly later. "After" used as a conjunction seems to emerge earlier than "before", although in the Turkish data, "before" and "after" appeared at the same age, 3.8. Since cross-sectional data may obscure developmental sequence, however, Adam's records give us a better hint as to order of emergence. "After" appeared at 3.5 in Adam's transcripts:

38) Can I make him a tree, after I finish this? (English, 3.5)

"Before" did not appear for another seven months:

39) You better move your legs, before I run over your legs. (English, 4.0)

In the Italian data as well, the notion "after" appears several months prior to "before." In most cases, however, the child uses quando ("when") with past tense markers on the verb to convey the idea of "after" as in 40:

40) Quando ha visto la televisione. (Italian, 3.4)
(Asked when his mother sleeps:
When she has watched television)

"Before" appeared only in the transcripts of children several months older:

41) Legge prima di andare a letto, (Italian, 3.4)
legge il giornale.
(Asked when her father reads:
He reads before going to bed, he reads
the paper)

Within the limits of our data, then, "after" emerges first. Although both "before" and "after" express temporal sequence, a concept which the child has long grasped, "before" is more complex in that it contains an implicit negative; the later event has not yet and may never take place, as in the adult example, "He caught the glass before it broke."[5] In Turkish and, in fact, in a number of other languages, a surface negative appears in the "before" clause:

42) Funda kalkmadam isimizi bitirelim. (Turkish, 3.8)
(Funda not having gotten up, let's finish
our work.
/Before/ Funda gets up, let's finish our work)

Closely related to temporal statements are conditionals. In fact, German uses the same particle, wenn, for notions which would be marked in English with either when or if. We have seen that children's early temporal sequences are implicitly causal or conditional and that their early causal utterances often give the immediate reason for the present state of affairs. The earliest conditional statements appeared in the Italian data. In all examples, the child encourages cooperation by asserting the consequences of non-compliance with a directive or the justification for giving it in the first place:

43) cudi allora . . . sennò e perdo. (Italian, 2.0)
(referring to his untied shoelaces:
Close then . . . or I'll lose them)

44) No, no via . . . sennò lo ovino. (Italian, 2.1)
(Talking about her new dress, which
she wants to take off:
No, no off . . . or I'll ruin it)

In sentences with senno ("if not"), the first conjunct is supported by the immediate context, and the child must deal with only one hypothetical event. In sentences with se ("if"), however, the child must present two hypothetical events, a situation which is conceptually more difficult. It

[5] Dan Slobin called our attention to this example.

is not surprising, then, that senno appears much earlier and is much more frequent than se, which appears in the data at 3.0, shortly after the acquisition of quando ("when"):

45) Io se corro mi fanno, mi faccio malo. (Italian, 3.0)
(If I run I hurt myself)

Most initial occurrences of the conditional in the German data are ambiguous between "when" and "if," as in 46:

46) Muss auch in de ecke gehn de puppe-- (German, 2.10)
wenn se so schreit.
(The doll must go in the corner, too,
when/if she cries like that)

The indicative/subjunctive distinction marked on the verb which would disambiguate this sentence is not acquired until much later. In our English data, too, the earliest conditionals are marked with when, as in example 30. "Adam" did not acquire the connective if for another three months. Temporal and conditional notions, then, are not at first differentiated; the temporal particle, usually acquired first, is used to express hypothetical statements before the acquisition of "if".

CONCLUSIONS

We have found a regular development in the surface expression of conjoined sentences. The stages the child passes through become increasingly complex both cognitively and linguistically. In the first and simplest cases, the child relates his coordinations, antitheses, sequences, and reasons to the immediate non-linguistic context and, sometimes, to another speaker's utterance. By accomplishing this step, the child establishes the foundation for producing two related utterances by himself, at first with separate intonation contours. Although the child perceives the relationship between his utterances, he cannot yet explicitly relate them on the surface. The first surface realizations of conjunction in our data are the use of a single intonation contour over both conjuncts, with or without a surface connective, and the use of a connective with two separate intonation contours.[6] The child next learns to combine these techniques, using a single intonation contour as well as a surface connective, later acquiring further refinements in the syntax of conjoined statements. Many of these refinements take place at points later in time than the ages we have investigated and depend on language specific factors. In Italian, for example, the verb in a clause introduced by prima ("first") must be in the subjunctive mood, a marking which is not acquired until late. The age at which a child achieves full mastery of the conjoining syntax will clearly vary with the complexity of the devices used in each language.

Despite the differences in the formal means of expression in the languages examined, however, our findings yield a fairly regular outline of development. The very earliest conjoined sentences express notions of symmetric coordination, antithesis, sequence, and causality. Soon after

[6] Intonation was marked differently in the various languages, but we assume that periods reflect sentence-final intonation.

the early causal statements, the first conditional notions emerge, appended to simple directives. At the next stage we find early "when" statements, which are both conditional and temporal. In all cases, the use of "when" expressing sequences of states and events precedes notions of simultaneity, which describe two overlapping actions or states. The last development we find is the use of "before" and "after" in subordinate clauses. The consistency of these findings across the four languages suggests an underlying cognitive basis for the order of emergence we have discovered. Further research with detailed longitudinal records are necessary to elucidate the details of this order and to establish its generality. The data we have analyzed, however, strongly suggest the existence of a universal cognitive order of emergence in the acquisition of the notions underlying conjoined statements.

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